## CLAIMS

1. A catheter positioning system comprising:

an elongate catheter having proximal and distal ends and at least one lumen extending there through, and it having a defined length;

at least one resilient member adjacent to distal end of the catheter configured to be selectively radially extended outward from the catheter; and

a control mechanism operatively associated with the resilient member and extending to the proximal end of the catheter where it is configured to be manipulated by a user to actuate the resilient member from a retracted to an extended position.

2. A catheter positioning system as defined in claim 1 further comprising:

a plurality of resilient members each having proximal and distal ends, all distal ends joined together and joined to the catheter at its distal end or adjacent its distal end and all proximal ends joined together and to the catheter at a position proximal to the distal end such that the resilient members lie parallel to the longitudinal axis of the catheter shaft when unloaded and such that the resilient members bow radially outward when a compressive load is applied to their distal ends.

3. A catheter positioning system as defined in claim 2 wherein the distal ends of the resilient members are joined to the catheter such that the distal end of the catheter is rotated through an angular displacement when the resilient members are bowed radially outward to an extended position.

4. A catheter positioning system as defined in claim 2 wherein the compressive force is applied by proximal movement of the control mechanism joined to the junction of the resilient member distal ends and the catheter.

5. A catheter positioning system as defined in claim 1 further comprising:

a plurality of resilient members each having proximal and distal ends, the proximal ends being an operative association with the control mechanism and the distal end being free such that movement of the control mechanism in the distal direction causes the distal ends of the members to advance radially outward away from the catheter to an extended position.

6. A catheter positioning system as defined in claim 5 wherein movement of the control mechanism and the distal are in the proximal direction causes the members to move radially inward to a retracted position such that the distal ends of the members do not protrude from the catheter.

7. A catheter positioning system as defined in claim 5 wherein each member is operatively associated with an independent control mechanism.

8. A catheter positioning system as defined in claim 5 wherein at least one of the resilient members is a tube having a lumen in fluid communication with a therapeutic agent that is pressurized from the proximal end of the catheter.

9. A catheter positioning as defined in claim 1 wherein at least one resilient member has a proximal end joined to a side wall of the catheter and a distal end that is free, the resilient member being naturally biased and arranged relative to the

catheter such that the member distal end does not protrude from the catheter until elastically deformed by movement of an object through the lumen of the catheter.

10. A catheter positioning system as defined in claim 9 wherein the object moved through the catheter lumen is an ischemia treatment device.

11. A catheter positioning system as defined in claim 10 wherein the ischemia treatment device comprises a tissue implant and associated delivery device.

12. A method of performing a catheter-based procedure to a particular treatment site within a patient comprising:

providing a catheter having a proximal end and a distal end and a radially extendible tissue engagement mechanism at its distal end;

navigating the catheter so that the distal end is adjacent to the intended tissue location;

causing the tissue engagement mechanism to extend into engagement with the tissue adjacent to treatment site; and

performing the medical procedure while maintaining the tissue engagement mechanism in its extended position.

13. A method of performing a catheter-based procedure as defined in claim 12 wherein the treatment site is the myocardium of the heart and the treatment is relieving the systems of ischemia.

14. A method of performing a catheter-based procedure as defined in claim 13 wherein the treatment of ischemia comprises advancing a tissue implant through the catheter and into the tissue at the treatment site.

15. A method of performing a catheter-based procedure as defined in claim 13 wherein the treatment for ischemia comprises delivering a therapeutic agent or cellular composition through the catheter to the treatment site.

16. A method of performing a catheter-based procedure as defined in claim 12 wherein the treatment site is the myocardium of the heart and the treatment is relieving the systems of ischemia.

17. A method for forming a catheter-based procedure wherein the tissue engagement mechanism comprises a tube in communication with a therapeutic agent pressurized from the proximal end of the catheter when the tissue engagement mechanism contacts the tissue to deliver the agent to the tissue.

18. A method for delivering a tissue implant into myocardial tissue of the heart comprising:

providing a catheter having at least one lumen and proximal and distal ends and a radially extendible tissue engagement mechanism at its distal end configured to be extended by the presence of a device in the lumen at the distal end of the catheter;

navigating the catheter to the intended implant location in the myocardium;

inserting a delivery device carrying the implant through the lumen of the catheter while applying a distal force in a distal direction upon both the catheter and the delivery device such that the distal end of the catheter abuts the implant site; and

driving the implant through the distal end of the catheter to extend the catheter positioning mechanism to locate the distal end of the catheter so that the implant can be delivered to the intended tissue location.

5